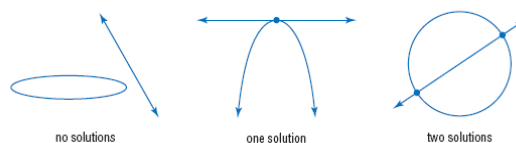


8-7 Solving Quadratic Systems

Line and quadratic

Quadratic and quadratic

SYSTEMS OF QUADRATIC EQUATIONS If the graphs of a system of equations are a conic section and a line, the system may have zero, one, or two solutions. Some of the possible situations are shown below.



If the graphs of a system of equations are two conic sections, the system may have zero, one, two, three, or four solutions. Some of the possible situations are shown below.



Solve.

$$4x^2 + y^2 = 25 \quad \text{ellipse}$$

$$2x + y = -1 \quad \text{line}$$

$$y = -2x - 1$$

$$4x^2 + (-2x - 1)^2 = 25$$

$$4x^2 + 4x^2 + 4x + 1 = 25$$

$$8x^2 + 4x - 24 = 0$$

$$2x^2 + x - 6 = 0$$

$$2x^2 + 4x - 3x - 6 = 0$$

$$2x(x+2) - 3(x+2) = 0$$

$$(2x-3)(x+2) = 0$$

$$x = \frac{3}{2} \quad x = -2$$

$$\left(\frac{3}{2}, -4\right) \quad (-2, 3)$$

When substituting to find y , use the linear equation.

Solve.

$$x^2 - 3y^2 = 8 \quad \text{hyperbola}$$

$$x - y = 2 \quad \text{line}$$

$$x = y + 2$$

$$(y+2)^2 - 3y^2 = 8$$

$$y = 1 \pm i$$

No Real sol'n

Solve.

$$x^2 + 2y^2 = 23 \quad \text{ellipse}$$

$$2x^2 - y^2 = 1 \quad \text{hyperbola}$$

$$\frac{4x^2 - 2y^2 = 2}{x^2 + 2y^2 = 23} \rightarrow 5x^2 = 25$$

$$x^2 = 5$$

$$x = \pm\sqrt{5}$$

$$(\sqrt{5})^2 + 2y^2 = 23$$

$$2y^2 = 18$$

$$y^2 = 9$$

$$y = \pm 3$$

$$(\sqrt{5}, 3) \quad (-\sqrt{5}, 3)$$

$$(\sqrt{5}, -3) \quad (-\sqrt{5}, -3)$$

$$(\pm\sqrt{5}, \pm 3)$$

Solve.

$$x^2 + y^2 = 25$$

$$2x^2 - 3y^2 = 30$$

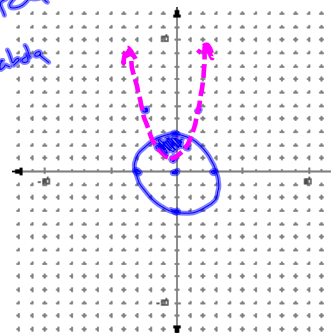
Solving systems of Inequalities.

$$x^2 + y^2 \leq 9$$

$$y > x^2 + 1$$

Circle
 $C(0,0)$
 $r = 3$
 (inside shaded)

Parabola
 $V(0,1)$ opens up
 $(1,2)$ $(2,5)$
 $(-1,2)$ $(-2,5)$



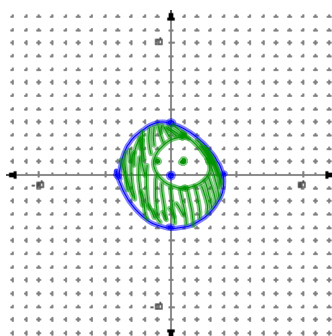
Solve.

$$x^2 + y^2 \leq 16$$

$$(x - 1)^2 + (y - 1)^2 \geq 4$$

$C(0,0)$ $r = 4$

$C(1,1)$ $r = 2$



HW

p458-459

17, 19, 21, 24, 28, 32-34

↑
line up